Powersports/Motorcycle Technology

Program of Studies
2014-2015

Todd Nickens, Program Consultant
Transportation Programs
Office of Career and Technical Education
Kentucky Department of Education
Todd.Nickens@education.ky.gov

Powersports/Motorcycle Technology

Course Title	Post-Secondary Connection	Valid Course Code	Recommended Grade Level							Recommended Credit
			6	7	8	9	10	11	12	
Advanced Engines /Drive Systems & Lab (Motorcycle)	MOT 200	470848						X	X	1
Basic Engines / Drive Systems & Lab (Motorcycle)	MOT 142	470845						X	X	1
Diagnostics And Troubleshooting & Lab (Motorcycle)	MOT 220	470847						X	X	1
Frames And Suspensions & Lab (Motorcycle)	MOT 156	470846						X	X	1
Fundamentals Of Electricity & Lab	FEX 100	460330						X	X	1
Intro To Motorcycles	MOT 100	470844						X	X	1
Performance Machining / Welding & Lab (Motorcycle)	MOT 234	470849						X	X	1

POWERSPORTS/MOTORCYCLE TECHNOLOGY EDUCATION

Overview of Powersports/Motorcycle Technology Education

Purpose:
The vision of Kentucky Powersports/Motorcycle Technology Education is to promote safety standards and performance standards, enhance leadership, provide relevant curriculum, and to be vital to the education of all students.
Kentucky Transportation Education will:

- Operate as the center for nationally recognized industry standard training.
- Provide a critical link in school to employment or postsecondary education.
- Develop stronger relationships with the community in terms of mutual advocacy, cooperative field experiences, employment placement, and support for relevant student organizations and competitions
- Represent an important component in the education of all students.
- Require and promote critical thinking and problem solving.
- Offer an up to date curriculum based on standards that adapts to changes in the industry.
- Integrate academic skills into the Transportation Education Curriculum in order to insure that students develop written & verbal communications skills, computational skills, and scientific/math problem-solving skills.

Career Pathways:

**Motorcycle Maintenance and Repair Technician*

Standard Based Curriculum
The curriculum is composed of industry standards based competencies/tasks. Therefore, the teaching/learning focus is on the final results rather than the process.

Kentucky Occupational Skill Standards
The Kentucky Occupational Skill Standards are the performance specifications that identify the knowledge, skills, and abilities an individual needs to succeed in the workplace. Identifying the necessary skills is critical to preparing students for entry into employment or postsecondary education. These standards described the necessary **occupational, academic,** and **employability** skills needed to enter the workforce or post- secondary education in specific career areas. There is an ongoing effort to continue to refine these standards by which exemplary Transportation Education Programs are evaluated and certified. This helps insure that curriculum meets industry specifications.

Work Based Learning
Cooperative experience, internships, shadowing and mentoring opportunities provide depth and breadth of learning in the instructional program and allow students to apply the concepts learned in the classroom. The Work Base Learning Guide is available on the KDE webpage: www.education.ky.gov.

Student Organizations and Competitions
Participation in Skills USA and the Ford AAA Auto Skills Competition provides a vehicle for students to employ higher order thinking skills, to interact with high-level industry people and to further enhance their leadership skill through their participation in regional, state and national competitive events and local activities.

TRANSPORTATION EDUCATION CAREER PATHWAYS 2015-2016

MOTORCYCLE MAINTENANCE AND REPAIR TECHNICIAN
CIP Code 47.0611.00

PATHWAY DESCRIPTION: A program that prepares individuals to apply technical knowledge and skills to repair, service, and maintain motorcycles and other similar powered vehicles. Includes instruction in lubrication and cooling systems, electrical and ignition systems, carburetion, fuel systems and adjustments of moving parts.

BEST PRACTICE CORE	**ILP-RELATED CAREER TITLES**
Foundational Skills Necessary for Career-Ready Measure: (KOSSA/Industry Certification) *Complete **(1) ONE CREDITS** from the following:* • 460330 Fundamentals of Electricity and Lab *Choose **(3) THREE CREDITS** from the following:* • 470848 Advanced Engines /Drive Systems & Lab (Motorcycle/Powersports) • 470845 Basic Engines / Drive Systems & Lab (Motorcycle/Powersports) • 470847 Diagnostic and Troubleshooting & Lab (Motorcycle/Powersports) • 470846 Frames and Suspensions & Lab (Motorcycle/Powersports)	Entry Level Powersports/Motorcycle Technician Service Advisor Dispatcher Warranty Clerk Sales Rep Service Manager

Advanced Coursework for Powersports/Motorcycle
1. Advanced course may be taken upon completion of a career pathway, but will not be considered credit for Perkins or Completer status. 2. Additional Co-op placement may be taken in conjunction with Advanced Courses
470849 Performance Machining/Welding and Lab
470844 Introduction to Motorcycles
470852 Co-Op Powersports/Motorcycle Technology
470853 Internship Powersports Motorcycle Technology

Sample Motorcycle/Powersports Career Pathway

KENTUCKY CAREER PATHWAY/PROGRAM OF STUDY TEMPLATE

COLLEGE/UNIVERSITY:
HIGH SCHOOL (S):
CLUSTER: Transportation
PATHWAY:
PROGRAM: Motorcycle/ATV Repair Technology

	GRADE	ENGLISH	MATH	SCIENCE	SOCIAL STUDIES	REQUIRED COURSES RECOMMENDED ELECTIVE COURSES OTHER ELECTIVE COURSES CAREER AND TECHNICAL EDUCATION COURSES			CREDENTIAL CERTIFICATE DIPLOMA DEGREE	SAMPLE OCCUPATIONS
SECONDARY	9	English I	Algabra I	Earth Science	World History	Health & PE	Computers	Word Processing		
	10	English II	Geometry	Biology	US History	Elective	Spreadsheets	Accounting		
	11	English III	Algrabra II	Introduction to Chemistry	Foreign Language	(MOT 100) Introduction to Motorcycles FEX 100 Fundamentals of Electricity	(MOT 142) Basic Engines and Drive Systems (WPP 200) Workplace Principles			
	12	English IV	Foreign Language	Introduction to Physics	Arts & Humanities	(MOT 156) Frames and Suspensions MOT 220 Diagnostics and Troubleshooting	(MOT 234) Performance Machine and Welding (MOT 200) Advanced Engines and Troubleshooting		• Equipment & Engine Training Council Certification o Two Stroke o Four Stroke	Motorcycle/ATV Repair, Motorcycle Saleperson,
POSTSECONDARY	Year 13	Writing	Math	Social Interaction	Heritage/ Humanities	Computer Literacy	(MOT 120) Motorcycle Sales and Marketing (BA 200) Small Business Management	(MOT 130) Shop Management (MOT 134) Service Requirements		
	Year 14	Oral Com	Elective	Science	Elective	Co-op	(OST 105) Introduction to Information Systems (MOT 244) Parts and Management	(ACC 201) Financial Accounting	AAS Degree	Motorcycle/ATV Repair, Motorcycle Saleperson, Shop Foreman, Shop Owner, Parts Sales, Sales Representitive
	Year 15	AAS Degree will transfer into the BS degree in Technology Management at					Morehead State University			
	Year 16	AAS Degree will transfer into the BS degree in Technology Management at					Morehead State University			

Required Courses
Recommended Elective Courses
Other Elective Courses
Career and Technical Education Courses
Credit-Based Transition Programs (e.g. Dual/Concurrent Enrollment, Articulated Courses, 2+2+2)
(◆=High School to Comm. College) (● =Com. College to 4-Yr Institution) (■ = Opportunity to test out)
Mandatory Assessments, Advising, and Additional Preparation

CCTI College and Career Transitions Initiative
Jobs for the Future
Funded by the U.S. Department of Education (V051B020001)
Revised Jan. 2005
October, 2006-CTE/Kentucky

Powersports/Motorcycle Courses/Tasks

Fundamentals of Electricity & Lab (Powersports/Motorcycle)
Valid Course Code:
460330

Course Description

This course introduces students to the basic physics of electricity. Students apply Ohm's Law; measure resistance, voltage, ohms, watts and amps; construct various types of electrical circuits; select wire and fuse sizes; and learn to trouble shoot an electric motor and coil.

Content/Process

Student Will:

1. Practice electrical safety.
2. Measure ohms with an ohmmeter.
3. Measure voltage with a voltmeter.
4. Measure amps with an ammeter.
5. Measure watts with a wattmeter.
6. Solve electrical circuit problems using Ohm's Law.
7. Draw and interpret electrical symbols.
8. Demonstrate series circuits, parallel circuits and series-parallel circuits.
9. Select wire and fuse sizes.

Connections:

*Common Core State Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*Post-Secondary: KCTCS FEX 100
*CTSO's – Skills USA

Introduction to Motorcycles
Valid Course Code:
470844

Course Description

Explores culture and history of motorcycles. Includes possible field trips to dealerships for student exploration into motorcycle industry.

Content/Process

Students Will:

1. Explain knowledge of early motorcycles.
2. Identify important developments in the motorcycle industry.
3. Explain the impact of foreign companies on the motorcycle industry
4. Identify the key component of motorcycle construction.
5. Identify various motorcycle organizations, their projects and activities.
6. Identify different types of motorcycles.
7. Identify restrictions to access and speed in motorcycles.

Connections:

*Common Core State Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*Post-Secondary: KCTCS MOT 100
*CTSO's – Skills USA

Basic Engines and Drive Systems & Lab
Valid Course Code:
470845

Course Description

Explores professional work habits, proper use of hand and power tools, service manuals, basic engine and parts identification. Covers internal combustion engines, transmissions, fuel systems, and assembly and disassembly.

Content/Process

Students Will:

1. Use proper tools to service an engine.
2. Demonstrate an understanding of camshaft design engines
3. Demonstrate an understanding of single cylinder engines.
4. Demonstrate an understanding of twin cylinder engines.
5. Demonstrate an understanding of multi-cylinder engines.
6. Service all types of engines using proper techniques and tools.
7. Disassemble single, twin cylinder engines.
8. Assemble single, twin cylinder engines
9. Inspect and repair pistons.
10. Inspect and repair valves.
11. Inspect and repair fuel injection systems.
12. Inspect and repair electronic systems.

Connections:

*Common Core State Standards
*KOSSA
*Common Core Technical Standard
*New Generation Science Standards
*Post-Secondary: KCTCS MOT 142
*CTSO's – Skills USA

Frames and Suspensions & Lab (Powersports/Motorcycles)
Valid Course Code:
470846

Course Description

Focuses on the design, operation, maintenance, and geometry of motorcycles. Explores basic principles of hydraulics and lubricants. Includes basic adjustments of all frame and suspension components

Content/Process

Students Will:

1. Change and repair wheels and tires.
2. Demonstrate proper maintenance techniques.
3. Demonstrate an understanding of frame design.
4. List types of frames.
5. Adjust steering systems.
6. Install shocks, springs, and swing arms.
7. Change drum and disc brakes.
8. Demonstrate an understanding of hydraulic and manual brakes.
9. Repair wheel components.
10. Repair and install tires.
11. Inspect and service brake systems.
12. Inspect and repair suspensions
13. Inspect and repair frame components.

Connections:

*Common Core State Standards
*KOSSA
*Common Core Technical Standard
*New Generation Science Standards
*Post-Secondary: KCTCS MOT 156
CTSO's – Skills USA

Advanced Engines / Drive Systems & Lab (Powersports/Motorcycle)
Valid Course Code:
470848

Course Description

Develops skills for engine and transmission overhaul. Emphasizes assembly and disassembly of all components of engine and transmission.

Content/Process

Students Will:

1. Disassemble engine components.
2. Inspect engine components.
3. Demonstrate shop safety while conducting disassembly and reassembly.
4. Disassemble transmission components.
5. Inspect transmission components.
6. Disassemble twin and multi-cylinder engines.
7. Assemble twin and multi-cylinder engines.
8. Repair single overhead camshaft.
9. Repair dual overhead camshaft.
10. Inspect and repair fuel injection systems.
11. Inspect and repair electronic systems.

Connections:

*Common Core State Standards
*KOSSA
*Common Core Technical Standard
*New Generation Science Standards
*Post-Secondary: KCTCS MOT 200
*CTSO's – Skills USA

Diagnostics and Troubleshooting & Lab (Powersports/Motorcycle)
Valid Course Code:
470847

Course Description

Focuses on appropriate procedures used in diagnosing customer concerns

Content/Process

Students Will:

1. Demonstrate an understanding of service manuals.
2. Use proper equipment to diagnose a problem.
3. Identify problems.
4. Follow troubleshooting procedures.
5. Identify and use service manuals.
6. Utilize diagnostic equipment to analyze motorcycles.
7. Systematically troubleshoot problems to identify and resolve.

Connections:

*Common Core State Standards
*KOSSA
*Common Core Technical Standard
*New Generation Science Standards
*Post-Secondary: KCTCS MOT 220
*CTSO's – Skills USA

Performance Machining and Welding & Lab
Valid Course Code:
470849

Course Description

Explores standard and performance-machining practices associated with performance motorcycles. Includes machining practices associated with valve jobs, cylinder boring and honing, big bore kits, and cylinder head porting and polishing. Covers basic welding and weld inspection practices.

Content/Process

Students Will:

1. Demonstrate proper welding techniques.
2. Demonstrate an understanding of welding equipment.
3. Demonstrate basic machining practices associated with valve jobs and cylinder head porting and polishing.
4. Demonstrate proper cylinder boring and honing techniques.
5. Identify proper welds.
6. Use proper tools for each task.
7. Demonstrate the proper care and handling of machining tools.
8. Demonstrate the proper care and handling of welding tools.
9. Setup welding project using proper safety techniques.
10. Perform aluminum welds.
11. Setup machining project using proper safety techniques.
12. Clean and maintain machining equipment.
13. Perform basic machining operations.

Connections:

*Common Core State Standards
*KOSSA
*Common Core Technical Standard
*New Generation Science Standards
*Post-Secondary: KCTCS MOT 234
*CTSO's – Skills USA